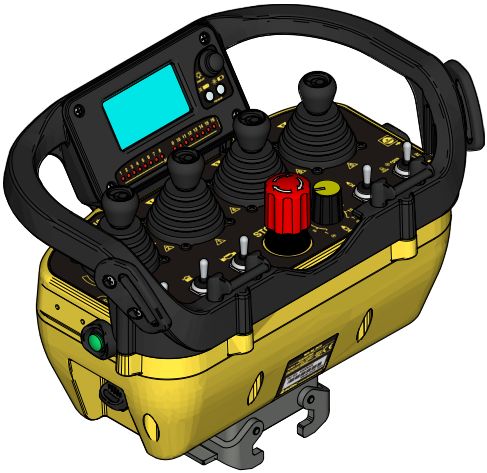
autec
safety remote control

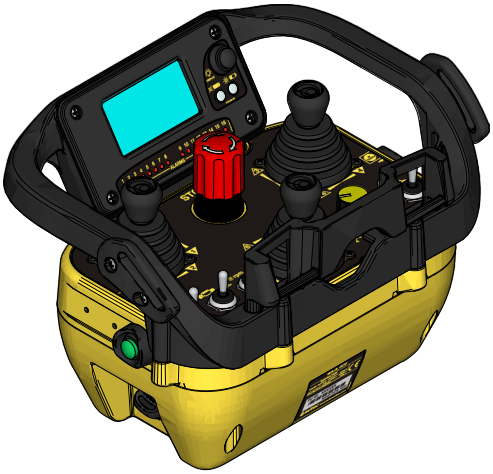
Original instructions

DYNAMIC SERIES

Cable control unit



WA-M and WC-M



WA-R and WC-R

PROVEN PROTECTION

LICCUE00-00

Warnings and caption for the documentation attached to the cable control unit

This manual is an integral part of the cable control unit and aims at providing all information for its usage and maintenance.Always remember that:

- photos and drawings are useful examples that help understand the instructions and warnings of each cable control unit configuration
- if necessary, contact Autec if any of the instructions and/or warnings are not clear.

No part of the documentation may be reproduced, in any form or by any means, without written permission of Autec (including recording and photocopying).
If documentation is lost or damaged, ask Autec for a copy. Please specify the serial number of the cable control unit.
This manual must be kept for the whole life of the cable control unit: after reading it, keep it on file for future reference.
Information contained in the documentation related to the cable control unit adds to and completes the information provided by the manufacturer of the cable controlled machine and/or by those who install the cable control unit on the machine.
All installation, usage and maintenance operations must be carried out by qualified technicians who are suitably trained with respect to the relevant norms and laws.
Therefore, this manual must be read and understood in all its parts by the user and by:

- the owner and/or installer of the cable control unit
- the person responsible for and in charge of maintenance and/or safety in the workplace where the cable control unit is used.

As for instructions and warnings regarding the machine where the cable control unit is installed, follow the instructions provided by the manufacturer in the machine's manual.
Three symbols are employed in the user manual, which are used to highlight specific safety-related issues. They are classified according to the hazardous situation that may arise and on the possible consequences:

Symbol	If the highlighted instructions are not respected ...		
	... a dangerous situation will occur…	**...consequences for people may be…**	**...consequences for property may be…**
DANGER	…highly probable.	… critical (death or physical damage).	… critical.
WARNING	… probable.	… critical (death or physical damage).	… critical.
CAUTION	… probable.	… moderate (non-severe physical damage).	… moderate.

	This symbol is also used, and it identifies texts to be read carefully.

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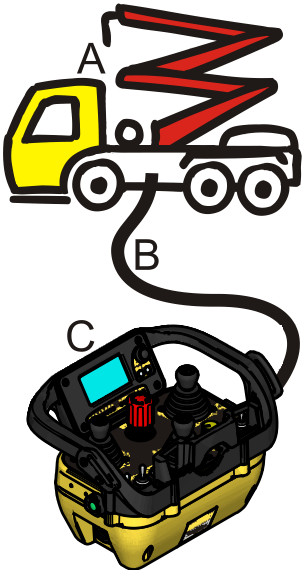
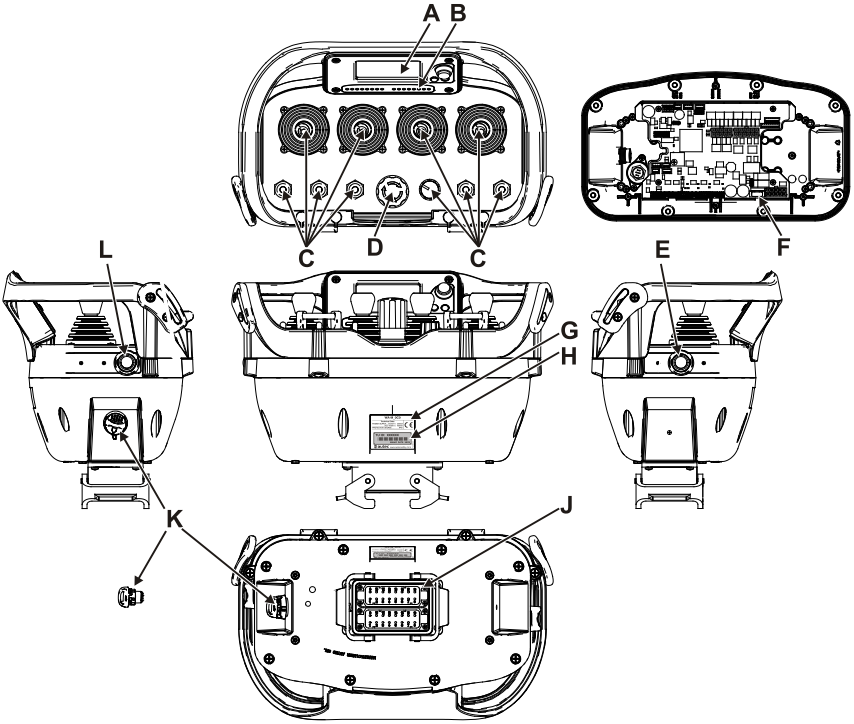
1 Description of the cable control unit

The Dynamic series cable control unit (from now on referred to as "unit") is a command and control system which is electrically connected to a machine and enables its control.
The user controls the machine by acting on the actuators on the unit.
Depending on the application, the unit is available in two different sizes. The bigger units, WA-M and WC-M, enable the use of more actuators than the two smaller units, WA-R and WC-R, to meet the needs of complex applications requiring a more functions.



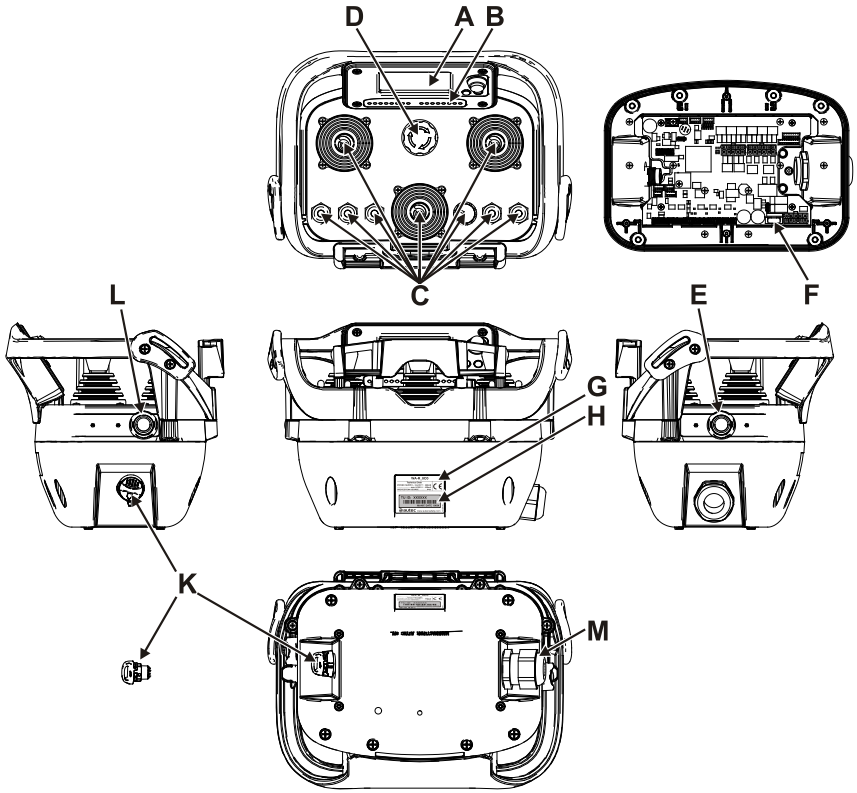
A	Machine
B	Cable
C	Unit

WA-M and WC-M



A	Display or LED (if present)	**G**	Technical data plate
B	LED	**H**	Identification plate
C	Actuators (joysticks, selectors, pushbuttons)	**J**	Plug or cable gland
		K	Starting keyswitch
D	Mushroom pushbutton	**L**	START pushbutton
E	W-TEACH pushbutton		
F	Output protection fuse		

WA-R and WC-R



A	Display or LED (if present)	**G**	Technical data plate
B	LED	**H**	Identification plate
C	Actuators (joysticks, selectors, pushbuttons)	**K**	Starting keyswitch
		L	START pushbutton
D	Mushroom pushbutton	**M**	Cable gland
E	W-TEACH pushbutton		
F	Output protection fuse		

1.1 Units WC-M and WC-R

Units WC-M and WC-R interface with the machine through a CAN network (of which they are slave nodes) and through some digital outputs.

1.2 Units WA-M and WA-R

Units WA-M and WA-R interface with the machine through proportional and digital outputs and through a CAN network (of which they are slave nodes).

2 Conformity

Units WA-M, WA-R, WC-M and WC-R comply with the EMC Directive (2004/108/EC) and the LVD Directive (2006/95/EC).
Units WA-M, WA-R, WC-M and WC-R also comply with the standards provided in the EC Declaration of Conformity that is enclosed with this manual.

3 Technical data

Power supply ..... 8-30V⎓
Protection of power supply (resettable fuse) 1.3A
Rated current of the contacts of the mushroom pushbutton ..... 3A (30V⎓)
Rated current of SO_1 and SO_2 outputs ..... 2A (30V⎓)
Protection of outputs (fuse F1) ..... 10A (32V⎓, autofuse)
Housing material ..... PA6 (20% fg)
Protection degree ..... IP65 (NEMA 4)
Dimensions of WA-M and WC-M 310x210x190mm (12.2x8.3x7.5In)
Dimensions of WA-R and WC-R 260x200x190mm (10.2x7.9x7.5In)
Weight of WA-M and WC-M 2.5kg (5.5Lb)
Weight of WA-R and WC-R 2.0kg (4.4Lb)

Performance Level of safety functions according to EN ISO 13849-1 / EN IEC 62061:
STOP protection ..... up to PL d cat.3 / SIL 2

3.1 WA-R and WA-M

Number of analogue outputs (PWM) 12
Number of analogue outputs (voltage) 6
Number of digital outputs 4
Rated current of analogue outputs (PWM) ..... 2A (30V⎓)
Rated current of analogue outputs (voltage) ..... 10mA (28V⎓)
Rated current of digital outputs ..... 2A (30V⎓)

3.2 WC-R and WC-M

Number of digital outputs 4
Rated current of digital outputs ..... 2A (30V⎓)

4 Technical data sheet

The technical data sheet contains the configuration of the unit and shows the relation between commands sent and the machine's movements and functions. It also contains the wiring diagram showing the connection between the unit and the machine.
The technical data sheet must be filled in, checked and signed by the installer, who is responsible for a correct wiring.
The technical data sheet must always be kept toghether with this manual (always keep a copy of the technical data sheet when it is used for administrative purposes).

WARNING	**The wiring of the unit outputs must always reflect the wiring indicated in the technical data sheet.**

5 Plates

The unit has the following plates:

Plate	Content
identification plate	Unit's serial number (TU ID), bar code and manufacturing year.
technical data plate	Name, main technical data and the unit's mark.

A serial number (TU ID) univocally identifies the unit.
The TU ID is on the unit's identification plate.
This is the only reference to be used both for maintenance operations and for declarations to competent bodies.
Plates on the unit must not be:
- removed from their position (removal will invalidate the guarantee)
- altered or damaged (contact Autec for replacement)

6 Applications

The unit can be installed on hoisting and material handling machines and on machines for moving, raising and transporting people (e.g. hydraulic cranes, aerial work platforms, telehandlers, concrete pumps).

DANGER	**The unit must not be installed:** - **on machines working in zones with risk of explosion** - **on machines where the unit's power supply does not come from a battery or from a power supply unit with safety isolating transformer** - **on machines that control loads that are not isolated from AC power supply (if that is the case)** - **on machines for which a risk assessment (see chapter 9) is not possible or gave negative results.**

Autec cannot be held responsible if the unit is installed on forbidden applications.

7 Classification of commands

7.1 Command type: analogue, digital or direction command

Commands activated by the unit are classified according to their type: they can be either analogue or digital commands.
Analogue commands generate proportional outputs as a function of the position of the corresponding actuator.
Digital commands switch the status of their corresponding output, according to the position of the related actuator. This status can either be on or off.
Direction commands are digital commands paired with analogue commands, and are used to specify the movement direction.

7.2 Name of commands

All commands activated by the unit are identified by abbreviations, which are provided in the technical data sheet to show the relation between the activated commands and the machine's functions.
The names of the unit outputs are not the names of commands. Check the technical data sheet to know which name they were given.

8 Mushroom pushbutton

The unit has a mushroom pushbutton that complies with standard IEC 60947-5-5 (see paragraph 14.3).
Such pushbutton can perform the stop function or act as an emergency stop.
The machine manufacturer or those who install the unit on the machine determine whether the mushroom pushbutton performs the stop function or the emergency stop.

8.1 Stop function

When the mushroom pushbutton is used to perform the machine's stop, it is marked with the “STOP” lettering.
The stop function brings the machine to a safe state every time it is necessary to stop it due to a potentially hazardous situation. This function is deliberately activated by the user by pressing this pushbutton.

8.2 Emergency stop

When the mushroom pushbutton is used as an emergency stop device, it is red on a yellow background, and it is marked with the “E-STOP” or “EMERGENCY STOP” lettering.
The emergency stop device complies with standard ISO 13850 and it must be included in an emergency stop circuit that complies with the same standard.
Emergency stops must meet the requirements provided in the Machinery Directive 2006/42/EC.

9 Risk assessment

As required by standards ISO 12100 and ISO 14121, all machines must undergo risk assessment and related analysis.
The unit can only be installed and used if this assessment gives positive results.

DANGER	**The machine manufacturer and/or the person who decides upon the installation and use of the unit is responsible for this risk assessment.**

Autec cannot be held responsible if this assessment has not been carried out correctly or is incomplete.
If required by the risk assessment, implement protection measures to prevent, reduce and report potential hazardous situations.

9.1 Risk assessment for machines controlled by the unit

When carrying out risk assessment for the machine or for the system where the unit is installed, the following must be considered:

- some machines cannot be controlled by the unit: check for forbidden applications (see chapter 6)
- dynamic laying wiring may be subject to crushing, abrasion, traction or shearing
- the "independent actuators"(see paragraph 14.4.7) may activate the related functions even when the unit is disabled or not powered
- all warnings related to installation, use and maintenance provided by Autec must be taken into account.

Please allow for installation of suitable cable hoses or carriers to enable the operator to move safely.

CAUTION	**Work organisation, machines' position, passages, etc. shall be planned so as to avoid that the unit's wiring may be involuntarily and unintentionally damaged by moving trolleys or by the ongoing operations.**

9.1.1 Protection from unintended activation

The unit housing is manufactured in such a way that it protects the actuators from unintentional activation, while meeting at the same time the operating needs, the comfort requirements and law restrictions.
Assessment shall be made to establish possible additional protection measures for the actuators (i.e. commands requiring two-hand operation, “dead-man” function) if particular environments, equipment and working modes could cause accidental bumps to the actuators.

9.1.2 Command activation and loss of command

Please consider that it is possible to unintentionally activate a command and/or involuntarily lose the selection of a command. Such anomalous events may be caused by electro-mechanical or mechanical damages in the system "machine+unit".
Carefully evaluate the possible consequences of such malfunction.
If required by the risk assessment, implement protection measures to prevent, reduce and report potential hazardous situations.

9.2 Staff training

All installation, usage and maintenance operations must be carried out by qualified technicians who are suitably trained with respect to:

- warnings resulting from risk assessment
- regulations and reference laws
- instructions and warnings provided in the documents related to the unit and to the machine
- Independent actuators on the unit
- instructions provided by those who install the unit on the machine and by the person in charge for safety in the workplace where the system "machine + unit" is used.

9.3 Working conditions

To guarantee correct use of the unit, all current regulations regarding safety at work and accident prevention must be respected. All applicable standards and regulations valid in the user country, regarding the use of both the machine and the unit, must always be respected.
Autec cannot be held responsible if the unit is used in unlawful working conditions.

10 Warnings for use

In addition to all instructions provided by the machine manufacturer, by the installer of the unit and by the person responsible for the safety of the work area, users shall always respect the following warnings.

10.1 Before starting to work

DANGER	**Stand in a position that allows the direct supervision of the machine and of the load's movements, and stay in a place that preserves the user's safety conditions in respect of other operations and/or activities and/or processes carried out in the workplace.** **Always check the correct mechanical operation of the mushroom pushbutton. If it is impossible or difficult to press this pushbutton, do not use the unit.** **The use of the unit entails risk of electric shock when working near overhead or underground power line's cables.**

WARNING	**If the unit is connected with the machine through dynamic laying wiring, do not pull the cables to pick up the unit..** **Never enable or use the unit if the working conditions present the risk of losing balance or tripping.** **Only enable or operate the unit when starting work: improper use may cause hazardous situations.** **Get familiar with the relation between the actuators and the machine's movements (this is indicated in the attached technical data sheet) and learn symbols on the unit's panel (symbols are defined by the machine manufacturer and/or installer depending on the machine's operation and functions).**

10.2 During normal operation

DANGER	**Pay attention to the entire work area. Immediately press the mushroom pushbutton when a hazardous situation occurs.**

WARNING	**Directly watch and check all machine's and load's movements.** **Be particularly careful when releasing the joysticks: do not release them too quickly and do not disable or switch off the unit when a movement is being performed, because the load and the machine may be subject to dangerous swings.** **If the unit is connected with the machine through dynamic laying wiring, lay the cables in such a way to prevent them from being crushed or strained by people or objects. Avoid contact with sharp or cutting objects that can cut the cables' protective sheath.** **Use the unit in a simple and comfortable way, avoiding accidental falls. The waist belt and the shoulder harness provided with the unit are used for that purpose.** **Pay particular attention to warnings and visual and acoustic signals, and take all measurements and steps to avoid that movements of the machine may lead to hazardous situations for people and/or property.** **In case of malfunction, disable the system “machine+unit” until the problem has been completely solved.**

10.3 After using the unit

WARNING	**Switch off the unit when work is stopped or temporarily interrupted. Do not leave the load hanging.** **If possible, disconnect the unit and the wiring and store them in a safe place (e.g. the vehicle's cab).** **Never leave the unit unguarded when the starting keyswitch is inserted.**

11 Unit's life cycle

To ensure safe and long-lasting operation of the unit, carefully follow the instructions provided for each stage of the product life cycle.

11.1 Transportation and storage

	The unit must always be transported and stored inside its packing until it is installed on the machine.

Environmental transportation and storage conditions are given in the following table.

	Temperature	Relative Humidity	Air Pressure
Transportation	Class 2K4 -40°C to +70°C (-40°F to +158°F)	Class 2K4 95% at 45°C (113°F)	Class 2K4 70kPa to 106kPa
Storage	Class 1K5 -40°C to +85°C (-40°F to +185°F)	Class 1K3 5% to 95%	Class 1K5 70kPa to 106kPa

11.2 Installation

WARNING	**Always follow the instructions provided in the technical data sheet to carry out correct installation.** **Please contact the machine manufacturer or the person who decided upon the installation of the unit for instructions and warnings regarding installation.**

	The unit can only be installed and tested by competent staff that masters the technical knowledge required to carry out these procedures and is qualified according to the regulation of the country where the unit is mounted. Only if the unit is installed correctly can it be used safely.

11.3 Use

The unit must be used only by skilled and properly trained personnel.

DANGER	**When the unit is installed on board vehicles, switch off the unit while the vehicle is moving.**

All warnings for correct use are given in chapter 10.
All instructions for correct use are given in chapters 13 and 14.
Environmental working conditions are given in the following table.

	Temperature	Relative Humidity	Air Pressure
Use	Class 5K4H -25°C to +55°C (-13°F to +131°F)	Class 5K2 5% to 95%	Class 5K2 70kPa to 106kPa

11.4 Maintenance of the unit

The following instructions provide information to safely carry out routine and special maintenance operations for the unit.
They shall be completed by:

- instructions provided by the machine manufacturer
- directions provided by the installer of the unit on the machine
- regulations regarding safety at work and accident prevention in force in the country where the unit is used.

All fine-tuning, checking and maintenance actions carried out on the unit shall be verified and recorded by the person in charge of carrying out maintenance on the machine.

DANGER	**Before any maintenance operation, disconnect power supply from the unit. If independent actuators are present, disconnect all electrical connections in the unit.** **After each maintenance action, always make sure that all commands sent by the unit only activate the corresponding expected operations.**

WARNING	**In case of malfunction or damaged parts, disable the system “machine+unit” until the problem has been completely solved.** **After each maintenance operation, if the unit has been opened, close it correctly in order not to endanger its protection degree from dust and water: check that the gasket is intact, correctly overlay the two parts of the housing and tighten all the screws using a 70Ncm (6.2lbfin) tightening torque.**

11.4.1 Routine maintenance

Routine maintenance consists of operations needed to preserve the unit's normal usage conditions, thus implementing fine-tuning, checks, planned replacement actions that necessarily arise from the normal use of the product.
All given instructions must be followed correctly at each commissioning, that is:

- whenever the unit and/or the machine is installed or assembled
- whenever the machine location/position changes
- after special maintenance.

Routine maintenance carried out as described in this manual is fundamental to safely use the unit.
Special applications may need more specific routine maintenance actions to be carried out at different periods (i.e. if the working environment is particularly dirty, in case of heavy applications or if the system is used very frequently, some maintenance actions may be required more frequently, depending on the decision of the person in charge for safety in the work site).

11.4.2 Daily routine maintenance

Before starting to work:

- make sure that the gaskets, bellows and caps of the joysticks, selectors and pushbuttons are intact, soft and elastic
- make sure that the unit's panel symbols can be easily recognised and replace the panel if necessary
- check that the two plates on the unit are readable and intact
- If the unit is connected with the machine through dynamic laying wiring, make sure that the cables are intact along their whole length.Cables' sheaths must not be damaged, especially at the cable glands. Make sure that the connecting plugs and sockets are intact and plugged.
- check the correct mechanical operation of the mushroom pushbutton.

During normal operation:

- check structural integrity of the unit
- make sure that materials that could endanger the unit usage and safety (such as concrete, sand, lime, dust) do not deposit on it.

After using the unit:

- clean the unit: never use solvents or flammable/corrosive materials and do not use high-pressure water cleaners or steam cleaners
- if possible, store the unit and its wiring in a clean and dry place, far from heat sources.

11.4.3 Three-month routine maintenance

Every three months:

- check that wiring is intact along its whole length.Sheaths of the connecting cables must not be damaged, especially at the cable glands. Make sure that the connecting plugs and sockets are intact and plugged.
- check that when the mushroom pushbutton is activated, the machine is taken to a safe state and the engine switches off, if expected
- make sure that the unit does not enable when a movement command is activated (try to enable the unit after moving the joysticks out of their rest position for each semi-axis).

11.4.4 Special maintenance

Special maintenance consists of repairs needed due to failure, damage, malfunction of the unit, and they are carried out with the aim of restoring the original usage and working conditions.

WARNING	**Prior to contacting the support service technicians:** - **read and understand all documents related to the unit, and make sure that all the instructions they contain have been accomplished correctly** - **follow the instructions to detect possible malfunctions and their origins.** **Any fault should be repaired by authorised personnel only (contact the support service of the machine's manufacturer), using original Autec spare parts only.**

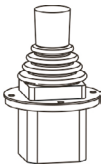
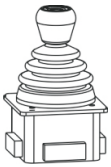
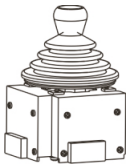
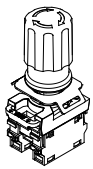
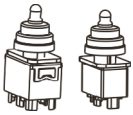
For faster and more effective service please report the following data:

- serial number
- purchase date (given on the certificate of guarantee)
- description of the problem found
- address and telephone number of the place where the device is being used (with the name of the person to contact)
- local supplier.

11.4.5 Preventive replacement of actuators (joysticks, pushbuttons and selectors)

Each actuator on the unit can be used for a defined maximum number of operations.

WARNING	**Replace joysticks, pushbuttons and selectors on the unit before they reach the maximum number of operations, even though they are still working.** **Replacement prevents possible failures that may lead to loss of safety.**

Actuator	Max. operations	Actuator	Max. operations
	$5x10^6$		$5x10^6$
	$5x10^6$		10^6
	$3x10^6$		$6x10^6$
	10^5		10^6
	10^5		

11.5 Machine maintenance

Follow instructions provided by the machine manufacturer and by the installer of the unit, in order to carry out machine maintenance.

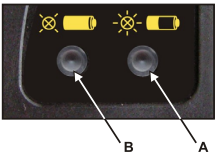
DANGER	**When carrying out maintenance on the machine, always disconnect power supply from the unit.** **Disconnect all unit's electrical connections whenever machine maintenance is carried out (i.e. when soldering).**

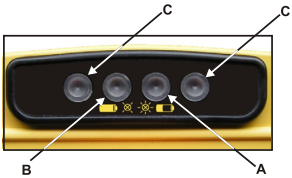
11.6 Disposal

When disposing of the unit, give it to the waste separate collecting services in the user's country.

12 Light signals

The unit may have two or four LEDs.





A	Red LED
B	Green LED
C	Red LEDs for Data Feedback function

In both cases, a green LED [B] and a red LED [A] are always available, and they provide information regarding the unit.
If the unit has 4 LEDs, the side LEDs [C] are red and provide information coming from the machine (Data Feedback function).

The green LED [B] ...	Meaning
...is off.	The unit is not powered.
... blinks fast	The unit is powered.
... blinks slowly	The unit is enabled.

The red LED [A]...	Meaning
... is illuminated for 2 seconds[a]	The unit does not work correctly.
... blinks once[a]	At enabling, the unit detects that the mushroom pushbutton is activated or damaged.
... blinks twice[a]	At enabling, the unit detects that one of the commands D2-D20 or SAFETY is activated or damaged (see technical data sheet).
... blinks four times[a]	At enabling, the unit detects that one of the commands A1-A8, L1-L8 and H1-H8 is activated or damaged (see technical data sheet).
... is steady on.	The REMOTE SETUP procedure is being performed (see chapter 15.).

a. An acoustic signal is also heard when the red LED [A] is illuminated.After this signal, the unit is disabled.

13 General operating instructions

13.1 Unit's power on

To power on the unit, do the following:
1. power the unit respecting the voltage limits provided in the technical data.
2. insert the starting keyswitch in the unit and turn it (see paragraph 14.1.1).

13.2 Enabling the unit

To enable the unit to send commands to the machine, press the START pushbutton when the unit is powered on, and do not release it until the green LED [B] starts blinking slowly.

13.3 Command activation

When the unit is enabled it is possible to move the joysticks, pushbuttons and switches corresponding to the command you want to perform.
The user must be properly trained about the symbols on the unit's panel, to be aware of the relation between actuators and movements on the machine (symbols used are defined by the machine manufacturer according to the functions of the machine).
Some specific commands may be present on the unit (see paragraph 14.4).

13.4 Data Feedback Function

The user receives information and/or signals concerning the controlled machine by means of the Data Feedback function.
During normal operation of the unit, pay particular attention to the indications displayed and signalled by the display or by the LEDs: they can be helpful to evaluate the machine working status.

WARNING	**Any information shown and signalled on the display or through the LEDs can never be considered or used as a safety signal or for legal metrology.** **When operating and moving the machine, remember that the unit does not intervene autonomously when potential hazardous situations are displayed and signalled.**

13.4.1 Operation with display

If the unit has a display, it is possible to show signal icons, measurements collected from the machine and their description.
The machine manufacturer chooses which information are displayed and the way they are displayed (icons and/or measurements and/or descriptions).

13.4.2 Operation with LED

If the unit has an LED array, specific machine conditions are signalled through their illumination (i.e. load limits, limit switch, …).
The signalled conditions depend on the settings chosen by the machine manufacturer.

13.5 Automatic unit disabling

The unit automatically disables if it remains enabled for a time equal to the “disabling time” while none of these commands is activated: SAFETY, D2-D10, H1-H8 and L1-L8.
The activation of this function and its cut-in time are decided by the machine manufacturer (see technical data sheet).

WARNING	**The independent actuators may activate the corresponding functions/ commands even when the unit is disabled**

13.6 Switching off the unit

The unit shall be switched off each time work is stopped: remove the starting keyswitch (see paragraph 14.1.2) and always store it in a safe place.
If possible, also store the unit in a safe place.

DANGER	**When the unit is installed on board vehicles, switch off the unit while the vehicle is moving.**

WARNING	**The independent actuators may activate the corresponding functions/ commands even when the unit is disabled**

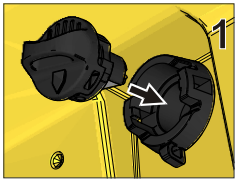
14 Operation

14.1 Starting keyswitch

The unit has a starting keyswitch from which it is powered.

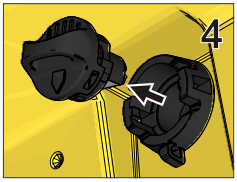
14.1.1 Inserting the starting keyswitch

Do the following to insert the starting keyswitch:
1. push the starting keyswitch into its receptacle
2. turn the starting keyswitch clockwise.

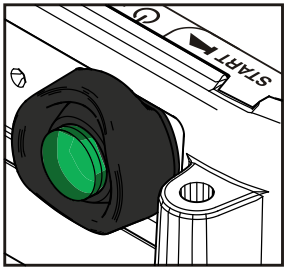


14.1.2 Removing the starting keyswitch

Do the following to remove the starting keyswitch:
3. turn the starting keyswitch anticlockwise
4. pull the starting keyswitch to remove it from its receptacle.



14.2 START pushbutton



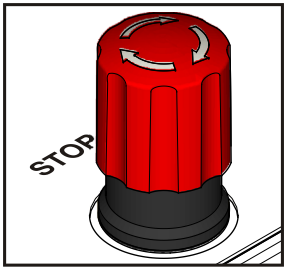
The START pushbutton is used to:
- enable the unit (see paragraph 13.2 and 13.5).
- activate the horn when the unit is enabled.

14.3 Mushroom pushbutton

DANGER	**The mushroom pushbutton should be pressed when it is necessary to immediately stop the machine when a dangerous condition occurs.**

When the mushroom pushbutton is pressed, the machine stops and the unit is disabled (the green LED [B] blinks fast). To start working again after the mushroom pushbutton has been pressed do the following:

1. make sure that the working and usage conditions are safe
2. turn the mushroom pushbutton in the arrow direction to unlock it
3. enable the unit (see paragraph 13.2).

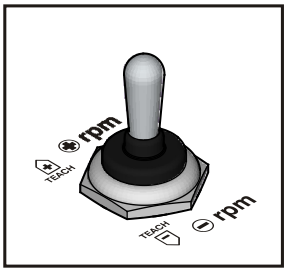


14.4 Command meaning

Commands on the unit are specified according to the machine's operations and functions. They are specified by the machine manufacturer, who also chooses the symbols used.
Some of the commands available on the unit are described in the following paragraphs (symbols provided here are generally used).

14.4.1 RPM+/- switch (during normal operation)

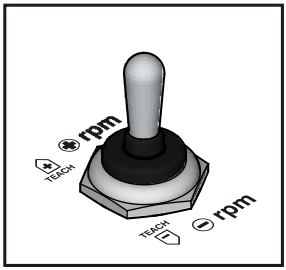
This switch increases (rpm +) or decreases (rpm -) the engine revolutions of the machine.



Symbol	Meaning
⊕ rpm	This symbol indicates the increase of the machine's engine revolutions.
⊖ rpm	This symbol indicates the decrease of the machine's engine revolutions.

14.4.2 TEACH switch (during REMOTE SETUP)

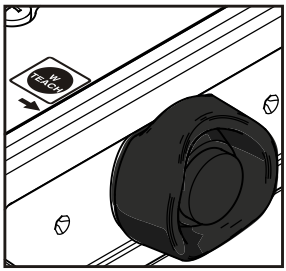
This switch is used to calibrate minimum and maximum values of proportional outputs and to invert the movement direction of the joystick's axis.



Symbol	Meaning
TEACH +	This symbol identifies the TEACH+ command.
TEACH −	This symbol identifies the TEACH- command.

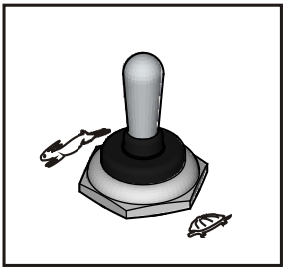
14.4.3 W-TEACH pushbutton

This pushbutton is used to:
- enter the REMOTE SETUP procedure.
- quit the REMOTE SETUP procedure.
- restore factory settings for the proportional outputs.



Symbol	Meaning
W TEACH	This symbol identifies the W-TEACH pushbutton.

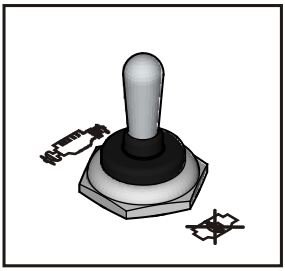
14.4.4 MOVEMENT SPEED SELECTOR



This switch is used to modify the movement speed
Depending on the configuration:
- it sets two or three speed levels
- it increases and/or decreases speed.

Symbol	Meaning
	This symbol indicates the normal machine's speed.
	This symbol indicates a reduction in the machine's speed (the reduction is set by the manufacturer).
	This symbol, if present, indicates a further reduction in the machine's speed (the reduction is set by the manufacturer).

14.4.5 Engine on/off switch



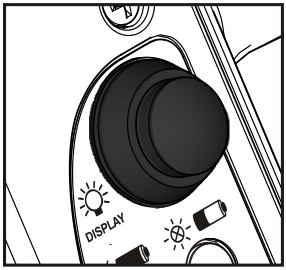
This switch is used to switch on and off the engine of the machine.

Symbol	Meaning
	This symbol indicates that the engine is powered on.
	This symbol indicates that the engine is switched off.

14.4.6 DISPLAY pushbutton (if the unit has a display)

This pushbutton is used to:
- activate the display lighting, if it is off
- cyclically scroll the information on the display in two different modes:
  - manual: the lines scroll up each time the pushbutton is pressed
  - automatic: when the DISPLAY pushbutton is pressed for 3 seconds, the lines scroll automatically. If the DISPLAY pushbutton is pressed again, it switches back to manual mode.

It is not possible to scroll the lines if icons only are displayed.
The display lighting stays on for a time set by the machine manufacturer.

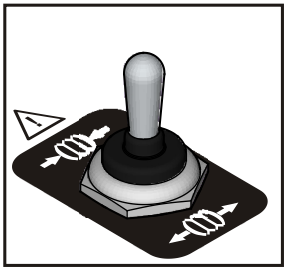


Symbol	Meaning
DISPLAY	This symbol identifies the DISPLAY pushbutton.

14.4.7 Independent actuators

CAUTION	**The functions related to the independent actuators may remain active even if the mushroom pushbutton is pressed or the unit is switched off.**

Some actuators on the unit may be directly connected with the machine's control board.
It may be possible to activate functions related to these actuators, even when the unit is disabled or switched off.



Symbol	Meaning
	This symbol identifies independent actuators.

15 Values of proportional outputs

Proportional outputs in the WA-M and WA-R unit are factory set: values are given in the technical data sheet.
When testing the unit, these values must be checked and, if necessary, modified according to the machine working mode.
The REMOTE SETUP procedure is used to modify:

- maximum and minimum values of proportional outputs (see paragraph 15.2)
- rest position values related to the proportional outputs (offset) (see paragraph 15.3)
- movement direction of the joystick's axis (see paragraph 15.4)

DANGER	**The REMOTE SETUP procedure can only be performed by skilled and properly trained personnel.**

WARNING	**During the REMOTE SETUP procedure, pay particular attention to the machine behaviour, as it moves as a response to acting on the actuators.**

	All values modified by performing the REMOTE SETUP are saved in the memory card on the unit. The REMOTE SETUP procedure is used to modify one proportional output at a time. The procedure will not be performed if the actuators corresponding to the other proportional outputs are not in the rest position.

If necessary, it is possible to restore factory settings at any time (see paragraph 15.5).

15.1 Light signals during the REMOTE SETUP procedure

The following table shows possible light signals appearing during the REMOTE SETUP procedure.

The red LED [A]...	The green LED [B]...	Meaning
... is steady on.	... is steady on.	Calibration of maximum and minimum values of proportional outputs is being performed (see paragraph 15.2).
	... repeats the sequence: three blinks and a pause.	Calibration of the values for the proportional outputs' rest position is being performed (see paragraph 15.3).
	... repeats the sequence: four blinks and a pause.	Inversion of movement direction of the joystick's axis is being performed (see paragraph 15.4)
	... blinks fast.	Two or more analogue commands are activated simultaneously or restoration of factory settings is being performed (see paragraph 15.5)

15.2 Calibrating maximum and minimum values of proportional outputs

1. Enable the unit.
2. Press the W-TEACH pushbutton and do not release it until the red LED [A] and the green LED [B] are steady on.
3. Set the desired values as follows:
   - For the maximum value, move the joystick to the full extension of the semi-axis corresponding to the output you want to calibrate. Maintain this position and act on the TEACH selector to set the desired value.
   - For the minimum value, move the joystick slightly out of the rest position of the semi-axis corresponding to the output you want to calibrate. Maintain this position and act on the TEACH selector to set the desired value.
   - Press the mushroom pushbutton to save the calibration.
   - Unlock the mushroom pushbutton, press and release the START pushbutton.
4. Repeat the previous step to calibrate other values.
5. To quit the procedure, press the W-TEACH pushbutton and do not release it until the red LED [A] switches off and the green LED [B] blinks slowly.

If the proportional outputs are activated by actuators other than joysticks (i.e. potentiometer, switch), calibrate maximum and minimum values according to the above mentioned procedure.

If a speed selector is present on the unit, minimum and maximum values have to be calibrated for each of this selector's positions.

15.3 Calibrating values related to the rest position of proportional outputs (offset)

1. Enable the unit.
2. Press the W-TEACH pushbutton and do not release it until the red LED [A] and the green LED [B] are steady on.
3. Activate and release the TEACH+ command and press and release the START pushbutton within one second.
4. Repeat the previous point until the green LED [B] repeats the sequence: three blinks and a pause.
5. Set the desired values as follows:
   - Move the joystick slightly out of the rest position on the axis corresponding to the output to calibrate. Maintain this position and act on the TEACH selector to set the desired value.
   - Press the mushroom pushbutton to save the calibration.
   - Unlock the mushroom pushbutton, press and release the START pushbutton.
6. Repeat the previous step to calibrate other values.
7. To quit the procedure, press the W-TEACH pushbutton and do not release it until the red LED [A] switches off and the green LED [B] blinks slowly.

If the proportional outputs are activated by actuators other than joysticks (i.e. potentiometer, switch), calibrate values related to the rest position according to the above mentioned procedure.

15.4 Inverting the direction of the joystick's axis

1. Enable the unit.
2. Press the W-TEACH pushbutton and do not release it until the red LED [A] and the green LED [B] are steady on.
3. Activate and release the TEACH+ command and press and release the START pushbutton within one second.
4. Repeat the previous point until the green LED [B] repeats the sequence: four blinks and a pause.
5. Do the following to invert the movement direction:
   - Move the joystick out of the rest position on the axis to be inverted. Maintain this position and activate once the TEACH+ command.
   - Press the mushroom pushbutton to save inversion.
   - Unlock the mushroom pushbutton, press and release the START pushbutton.
6. Repeat the previous step to invert other directions.
7. To quit the procedure, press the W-TEACH pushbutton and do not release it until the red LED [A] switches off and the green LED [B] blinks slowly.

15.5 Restoring factory settings

This procedure is used to restore factory settings for the proportional outputs.

1. Enable the unit.
2. Press the W-TEACH pushbutton and do not release it until the red LED [A] and the green LED [B] are steady on.
3. Press the W-TEACH pushbutton three times and do not release it at last pressure; the green LED [B] blinks fast: this indicates that factory settings are being restored.
4. Release the W-TEACH pushbutton when the green LED [B] is steady on again. If the W-TEACH pushbutton is released before the green LED [B] is steady on, factory settings of proportional outputs will not be restored.
5. To quit the procedure, press the W-TEACH pushbutton and do not release it until the red LED [A] switches off and the green LED [B] blinks slowly.

16 Troubleshooting

When the unit does not work, check if the problem lies with the unit itself or with the machine. Therefore, before any inspection, try to control the machine with a different control unit, if applicable. If the problem persists, it lies with the machine. If not, the problem may lie with the unit. In such case, please refer to paragraph 16.2.

16.1 Unit with Data Feedback function

It is still possible that the unit controls the machine even if the Data Feedback function does not work properly, or if there is no information and/or signals coming from it.

CAUTION	**Contact the support service of the machine manufacturer when the display or the LEDs do not work properly.**

16.2 Solutions in case of malfunction

First make sure that the wiring is intact and correctly connected with both the machine and the unit and replace it if needed.
Use the light signals on the unit to identify the malfunction and look it up in the following table.
If the problem persists after the suggested solution has been carried out, contact the support service of the machine manufacturer.

Signals	Possible reason	Solutions
The green LED [B] is off	The unit is not powered.	Disconnect the power supply and restore it after 5 minutes: the restorable thermal fuse may have temporarily cut in.
The red LED [A] is steady on and the green LED [B] blinks twice.	Error on the memory card.	Contact the support service of the machine manufacturer.
The red LED [A] is steady on and the green LED [B] blinks fast.	Two or more analogue commands are being activated simultaneously within the REMOTE SETUP procedure.	Check actuators on the unit and activate one single analogue command.
The red LED [A] illuminates steadily for 2 seconds and then the unit is disabled [b].	The unit does not work correctly.	Contact the support service of the machine manufacturer.
The red LED [A] blinks once during the unit's enabling [b].	The mushroom pushbutton is locked or damaged.	Unlock the mushroom pushbutton. If this signal persists, contact the support service of the machine manufacturer.
The red LED [A] blinks twice during the unit's enabling [b].	At least one of the actuators corresponding to commands D2-D20 and SAFETY is activated or damaged.	Make sure that the actuators are in the rest position. If this signal persists, contact the support service of the machine manufacturer.
The red LED [A] blinks four times during the unit's enabling [b].	At least one of the actuators corresponding to commands A1-A8, L1-L8, H1-H8 and SAFETY is activated or damaged.	Make sure that the actuators are in the rest position. If this signal persists, contact the support service of the machine manufacturer.

b. An acoustic signal is also heard when the red LED [A] is illuminated.After this signal, the unit is disabled.